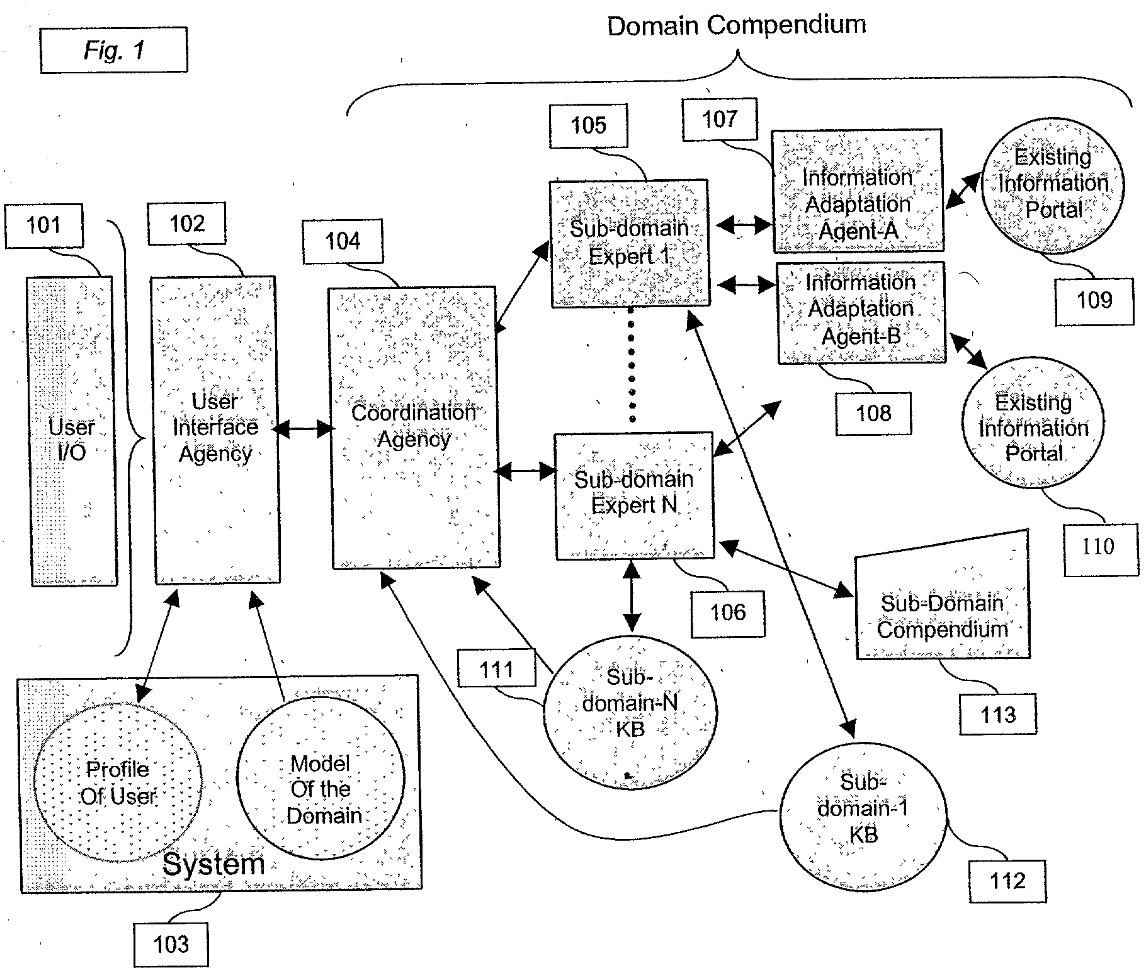
Fig. 1



Domain Compendium
101
User I/O
102
User Interface Agency
104
Coordination Agency
105
Sub-domain Expert 1
107
Information Adaptation Agent-A
Existing Information Portal
109
Information Adaptation Agent-B
108
Existing Information Portal
110
Sub-domain Expert N
106
Sub-Domain Compendium
113
111
Sub-domain-N KB
Sub-domain-1 KB
112
Profile Of User
Model Of the Domain
System
103

Fig. 2

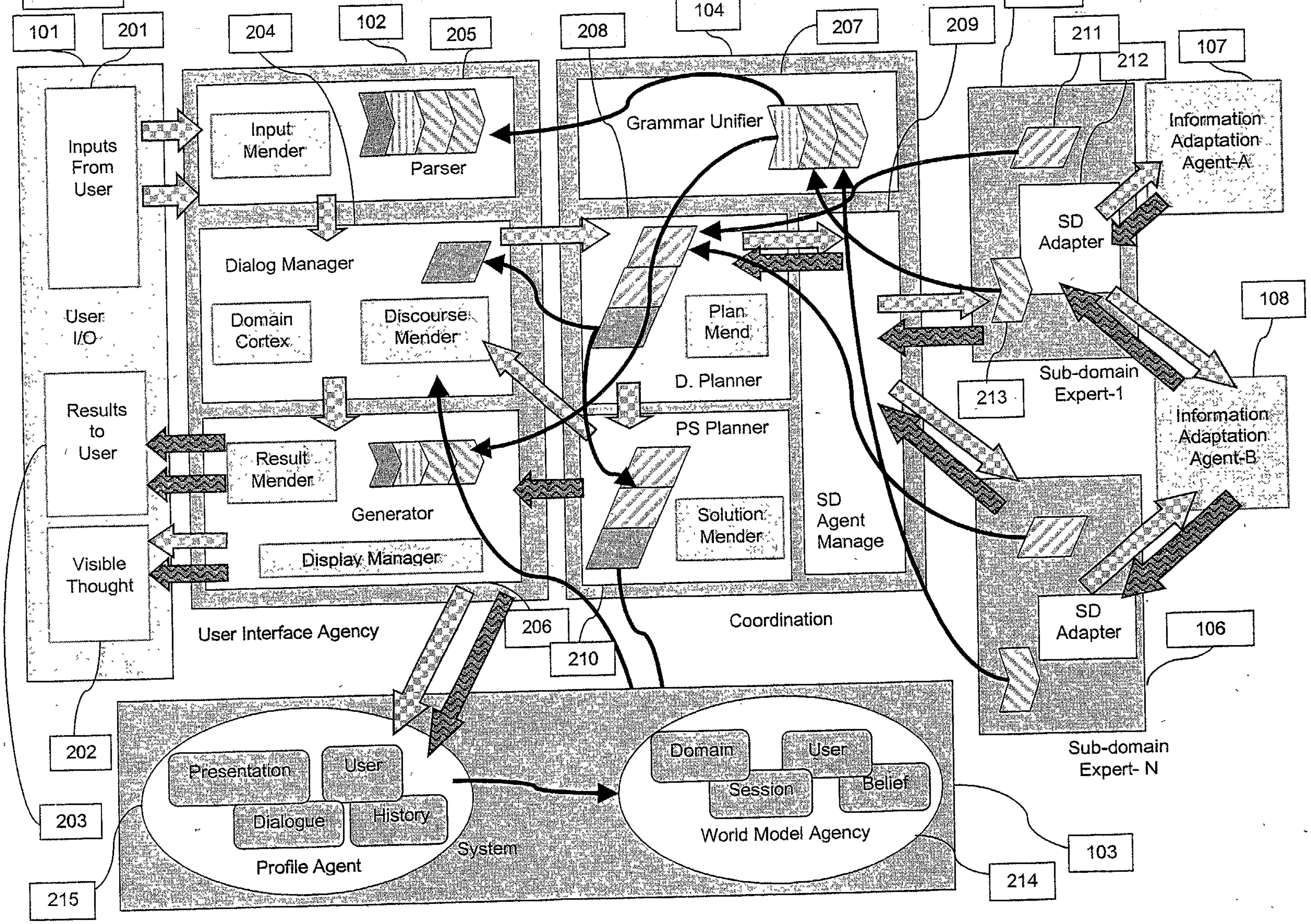

101
201
204
102
205
208
104
207
209
105
211
212
107
Inputs From User
User I/O
Results to User
Visible Thought
Input Mender
Parser
Dialog Manager
Domain Cortex
Discourse Mender
Result Mender
Generator
Display Manager
User Interface Agency
Grammar Unifier
Plan Mend
D. Planner
PS Planner
Solution Mender
SD Agent Manage
Coordination
SD Adapter
Information Adaptation Agent-A
Sub-domain Expert-1
213
108
Information Adaptation Agent-B
SD Adapter
Sub-domain Expert- N
106
206
210
202
203
215
Presentation
User
Dialogue
History
Profile Agent
System
Domain
User
Session
Belief
World Model Agency
103
214

Fig. 3

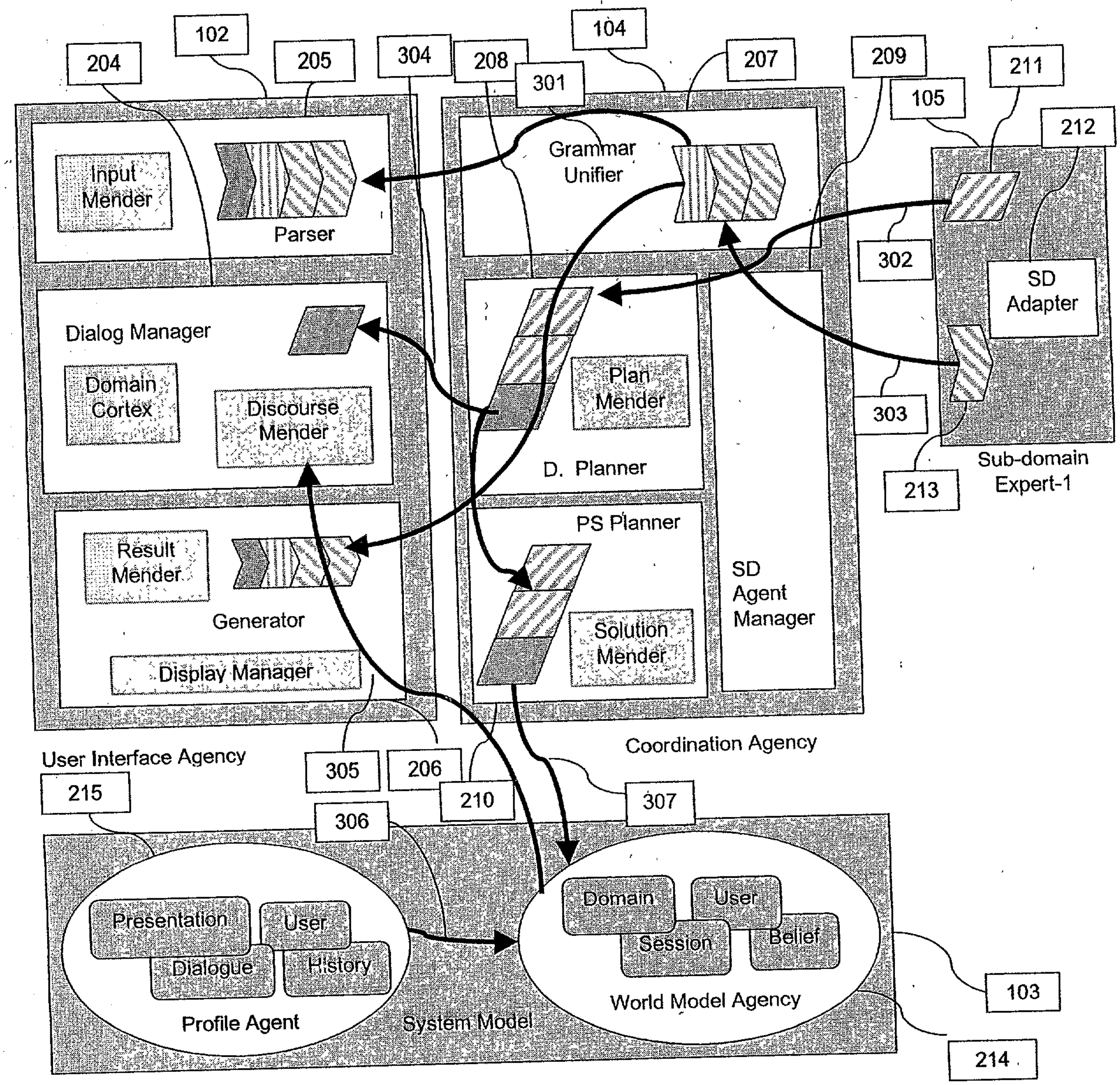

204
102
205
304
208
301
104
207
209
211
105
212
Input Mender
Parser
Grammar Unifier
302
SD Adapter
Dialog Manager
Domain Cortex
Discourse Mender
Plan Mender
D. Planner
303
213
Sub-domain Expert-1
PS Planner
SD Agent Manager
Result Mender
Generator
Solution Mender
Display Manager
User Interface Agency
Coordination Agency
215
305
206
210
307
306
Presentation
User
Dialogue
History
Profile Agent
System Model
Domain
User
Session
Belief
World Model Agency
103
214

Fig. 4

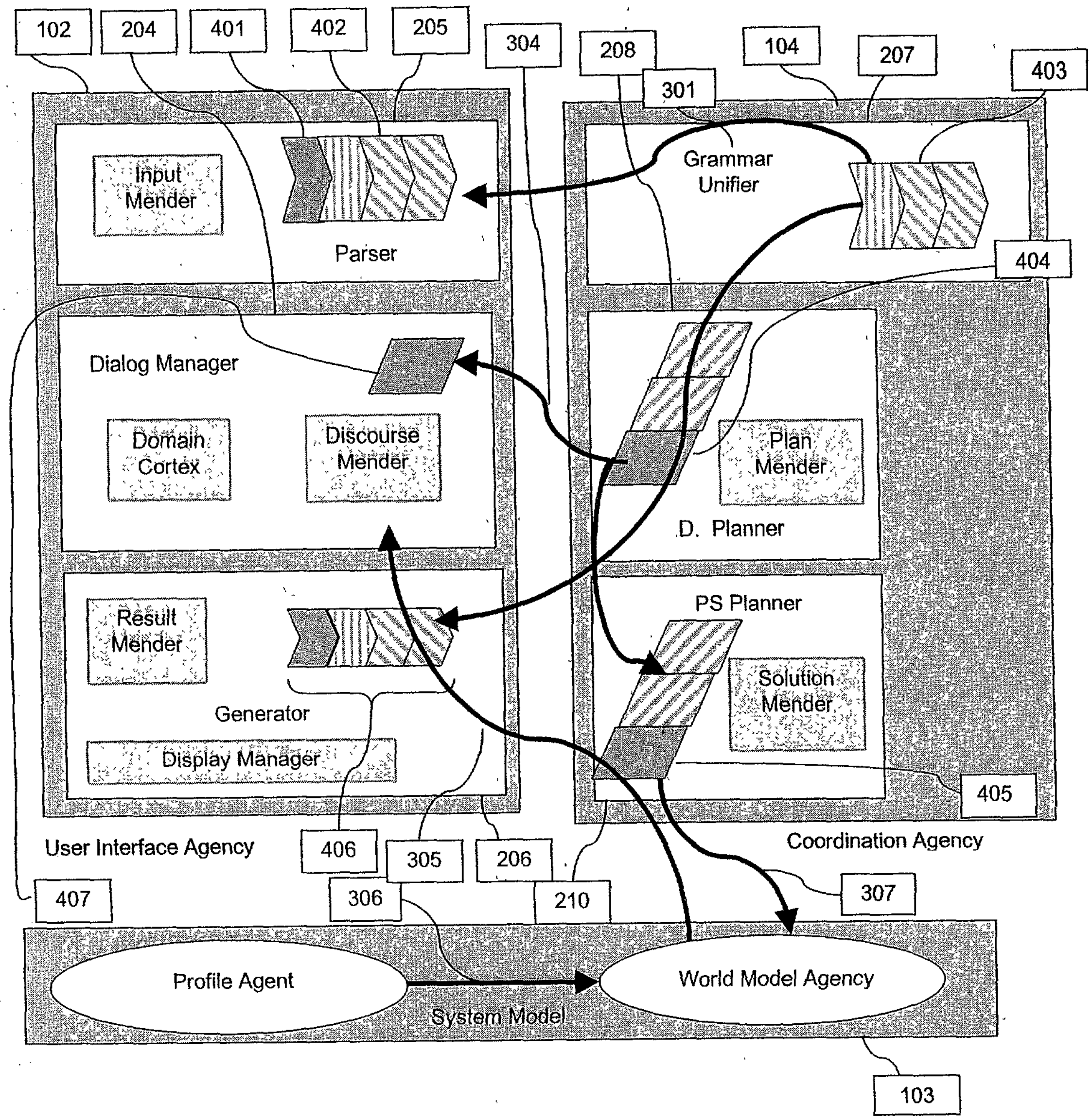
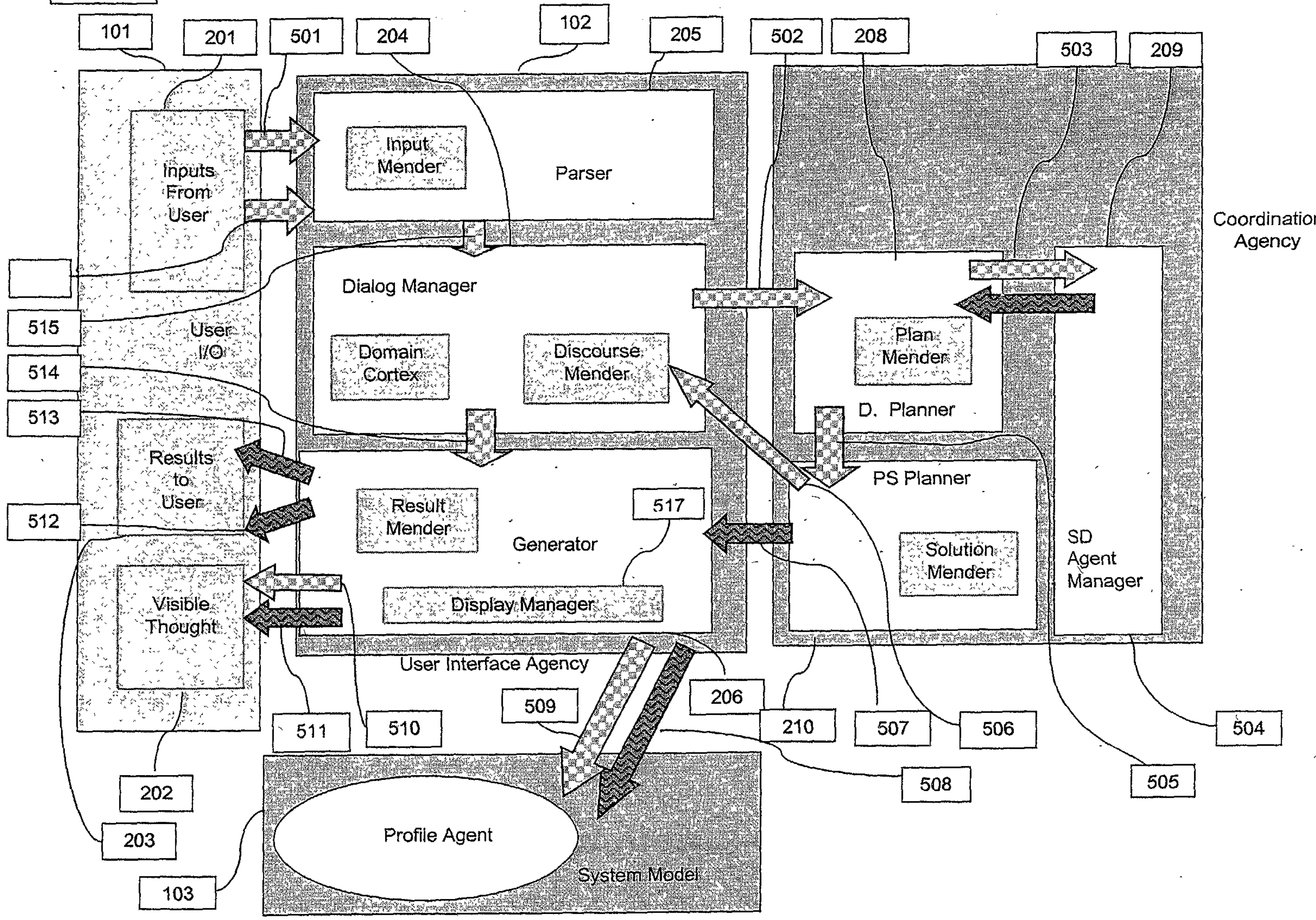
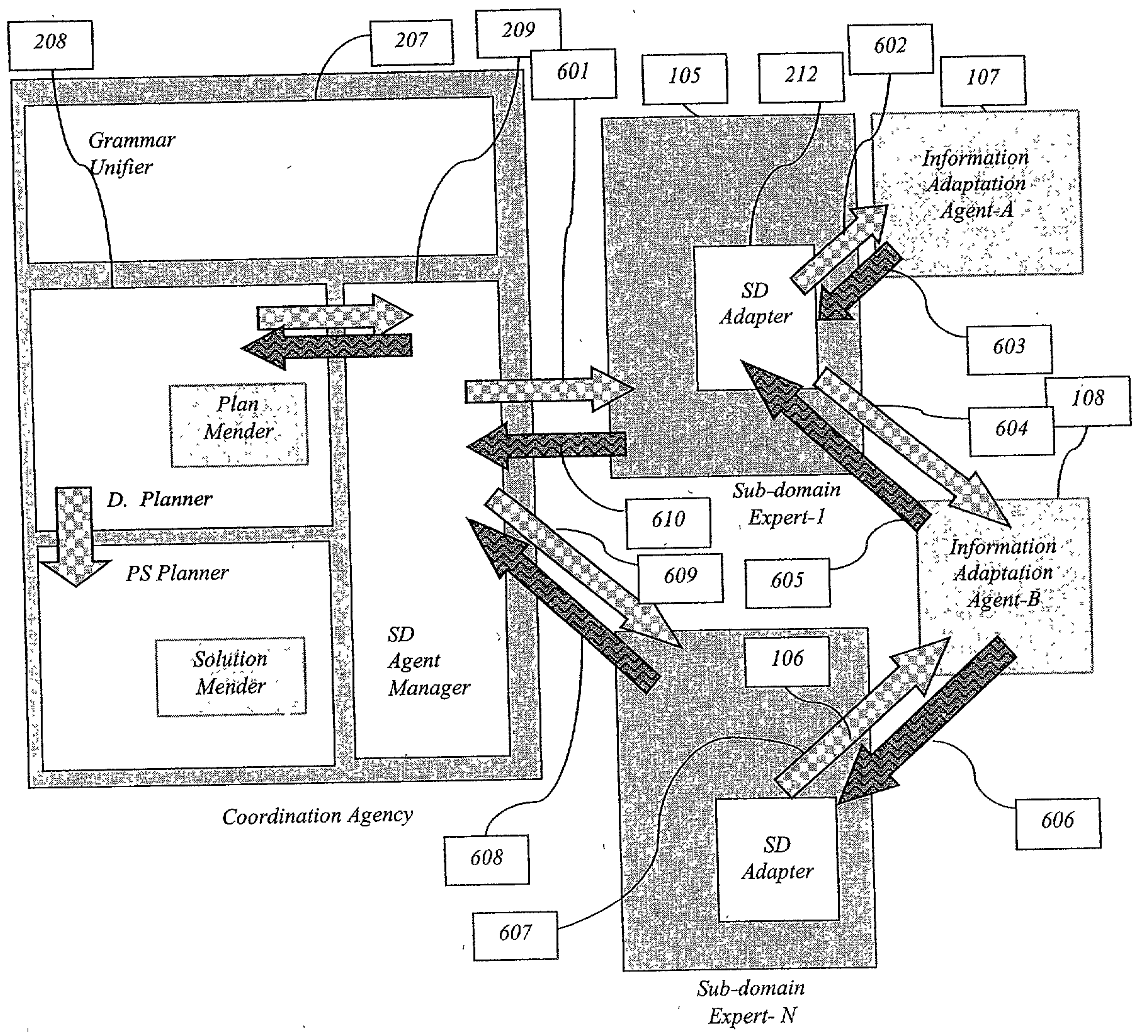

102
204
401
402
205
304
208
301
104
207
403
Input Mender
Parser
Grammar Unifier
404
Dialog Manager
Domain Cortex
Discourse Mender
Plan Mender
D. Planner
PS Planner
Result Mender
Generator
Display Manager
Solution Mender
405
User Interface Agency
406
305
206
Coordination Agency
407
306
210
307
Profile Agent
World Model Agency
System Model
103

Fig. 5



101
201
501
204
102
205
502
208
503
209
Input Mender
Parser
Inputs From User
Coordination Agency
Dialog Manager
Plan Mender
515
User I/O
Domain Cortex
Discourse Mender
514
D. Planner
513
Results to User
PS Planner
Result Mender
517
512
Generator
Solution Mender
SD Agent Manager
Visible Thought
Display Manager
User Interface Agency
509
206
511
510
210
507
506
504
508
505
202
Profile Agent
203
System Model
103


208
207
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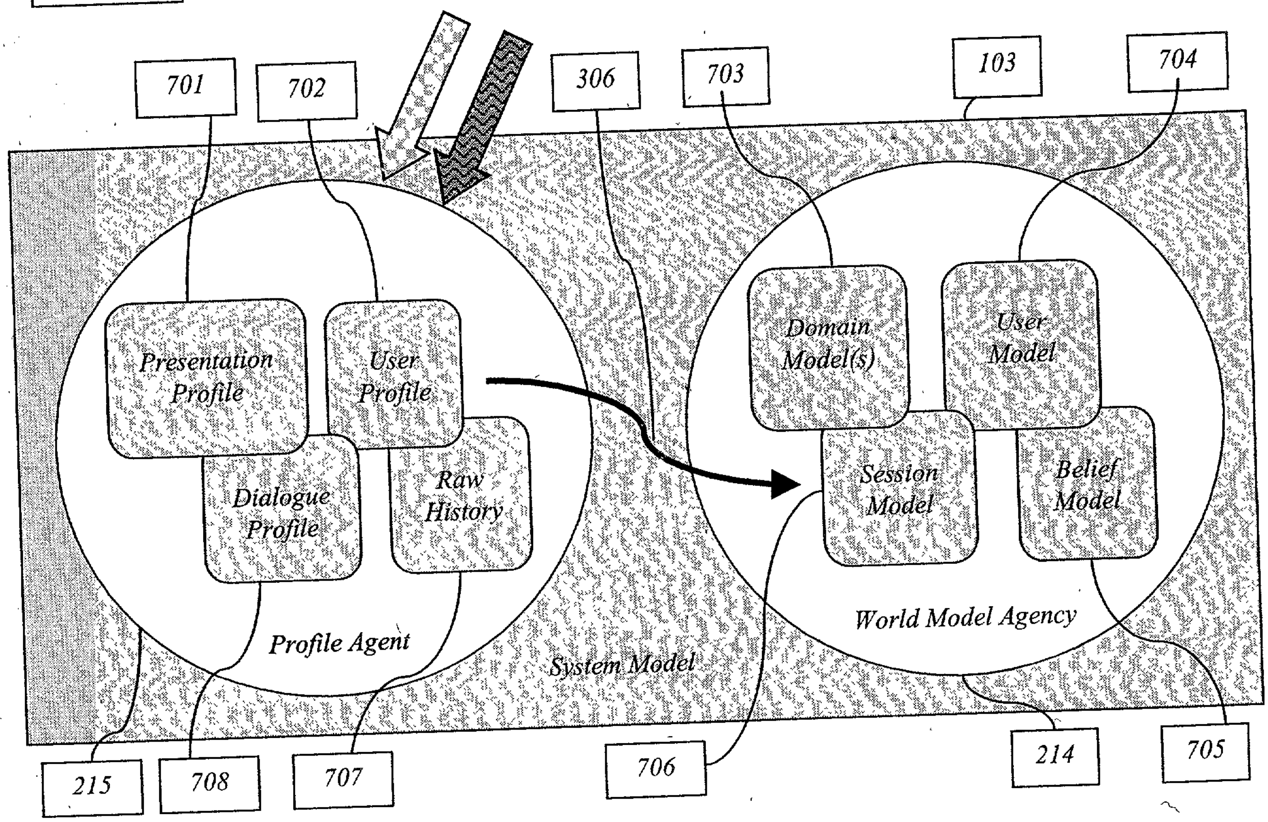
105
212
602
107
Grammar Unifier
Information Adaptation Agent-A
SD Adapter
603
Plan Mender
D. Planner
PS Planner
Solution Mender
SD Agent Manager
604
108
610
Sub-domain Expert-1
609
605
Information Adaptation Agent-B
106
Coordination Agency
606
608
SD Adapter
607
Sub-domain Expert- N

Fig. 6

Fig. 7



701
702
306
703
103
704
Presentation Profile
User Profile
Dialogue Profile
Raw History
Profile Agent
Domain Model(s)
User Model
Session Model
Belief Model
World Model Agency
System Model
215
708
707
706
214
705

Fig. 8

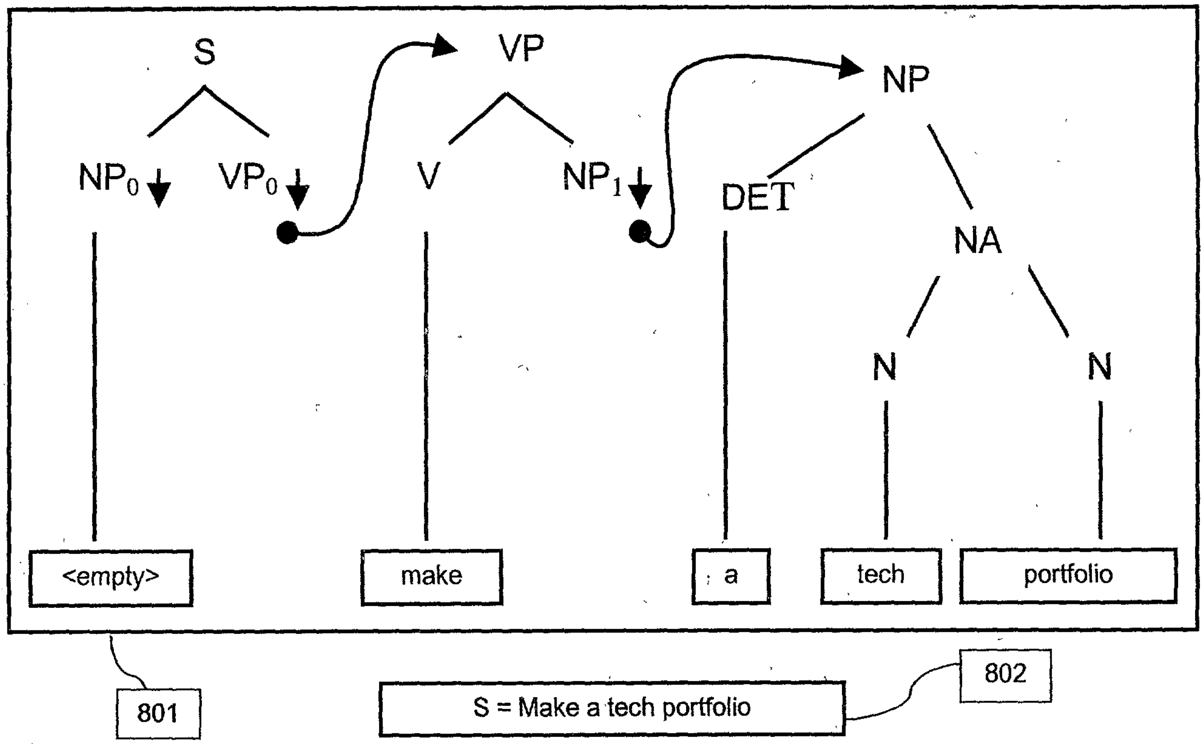

S
VP
NP
NP_0↓
VP_0↓
V
NP_1↓
DET
NA
N
N
<empty>
make
a
tech
portfolio
801
802
S = Make a tech portfolio

Fig. 9

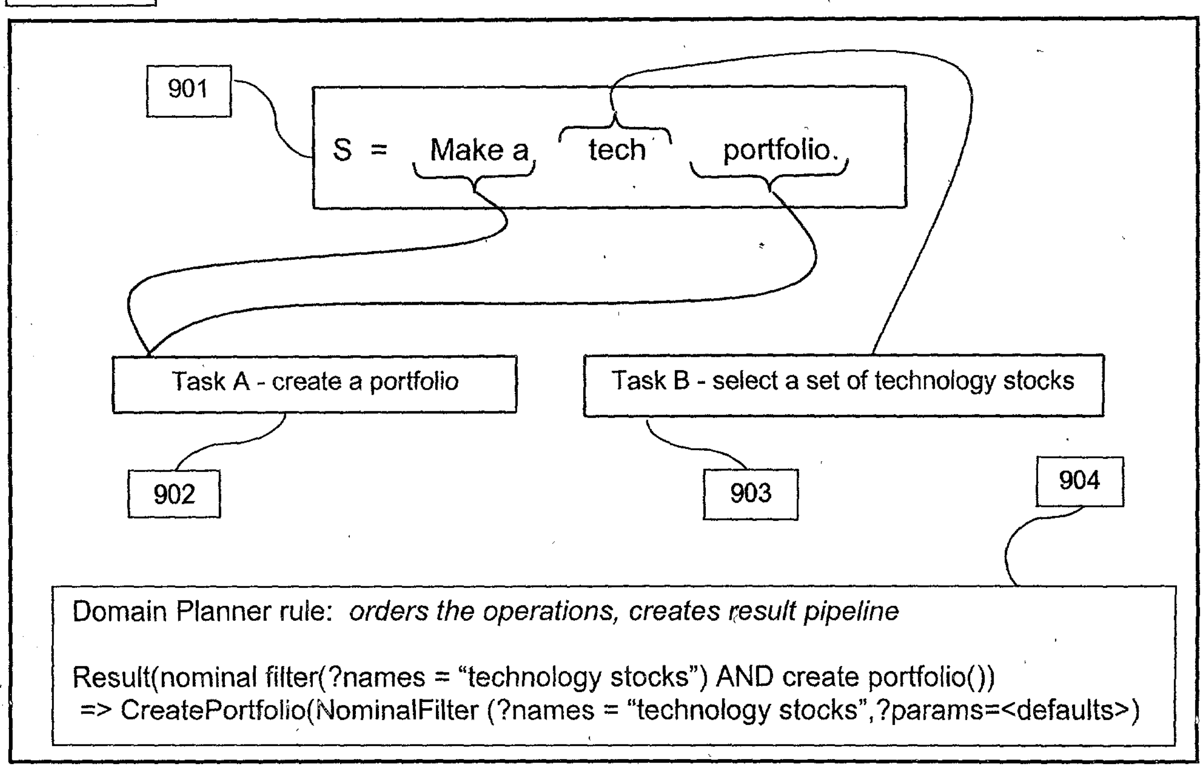

901
S = Make a tech portfolio.
Task A - create a portfolio
Task B - select a set of technology stocks
902
903
904
Domain Planner rule: *orders the operations, creates result pipeline*
Result(nominal filter(?names = "technology stocks") AND create portfolio())
=> CreatePortfolio(NominalFilter (?names = "technology stocks",?params=<defaults>)

Fig. 10

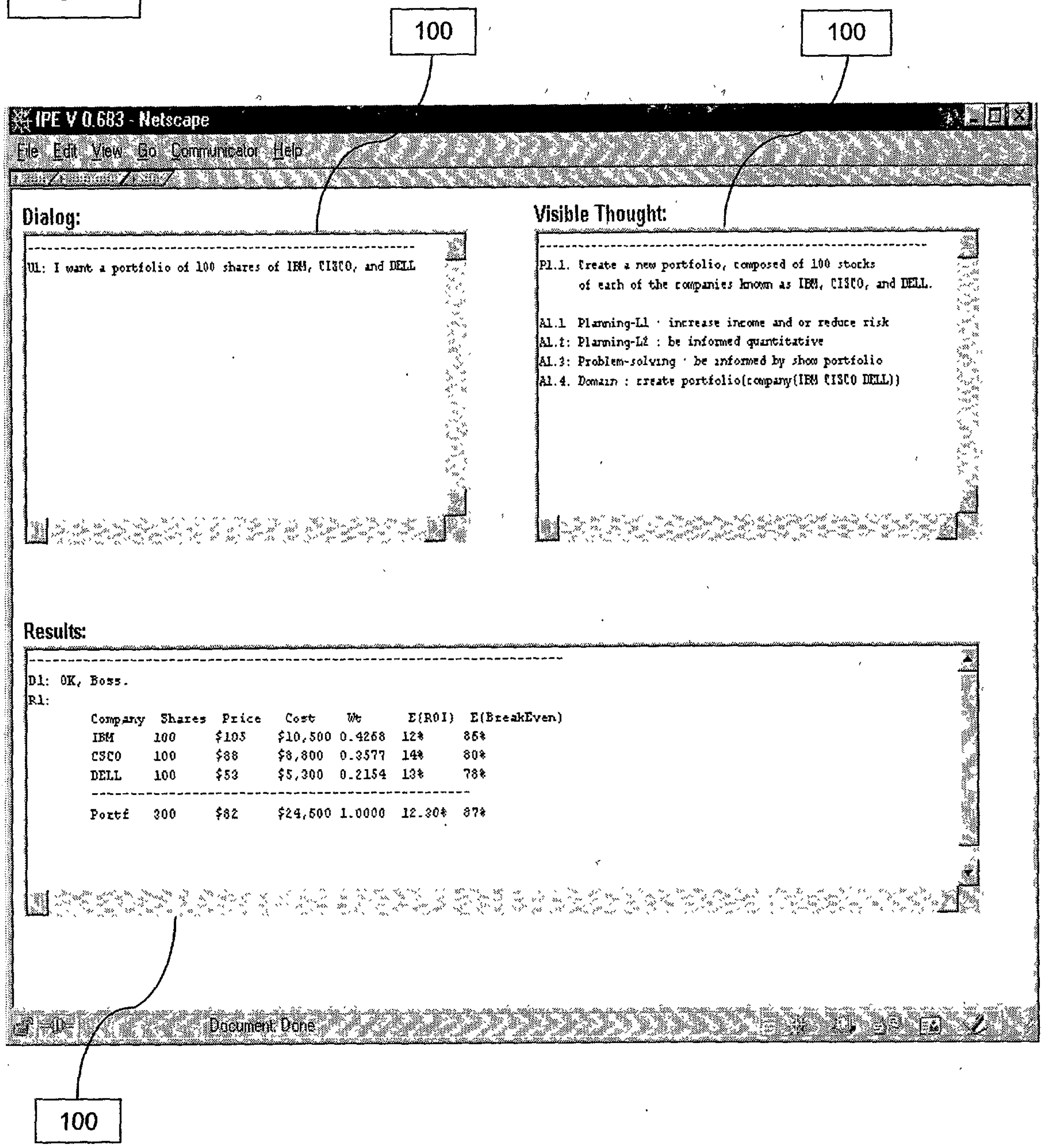

100
100
IPE V 0.683 - Netscape
File Edit View Go Communicator Help
Dialog:
U1: I want a portfolio of 100 shares of IBM, CISCO, and DELL
Visible Thought:
P1.1. Create a new portfolio, composed of 100 stocks
of each of the companies known as IBM, CISCO, and DELL.
A1.1 Planning-L1 : increase income and or reduce risk
A1.2: Planning-L2 : be informed quantitative
A1.3: Problem-solving : be informed by show portfolio
A1.4. Domain : create portfolio(company(IBM CISCO DELL))
Results:
D1: OK, Boss.
R1:
Company Shares Price Cost Wt E(ROI) E(BreakEven)
IBM 100 $105 $10,500 0.4268 12% 86%
CSCO 100 $88 $8,800 0.3577 14% 80%
DELL 100 $53 $5,300 0.2154 13% 78%
Portf 300 $82 $24,600 1.0000 12.30% 87%
Document: Done
100

Fig. 11

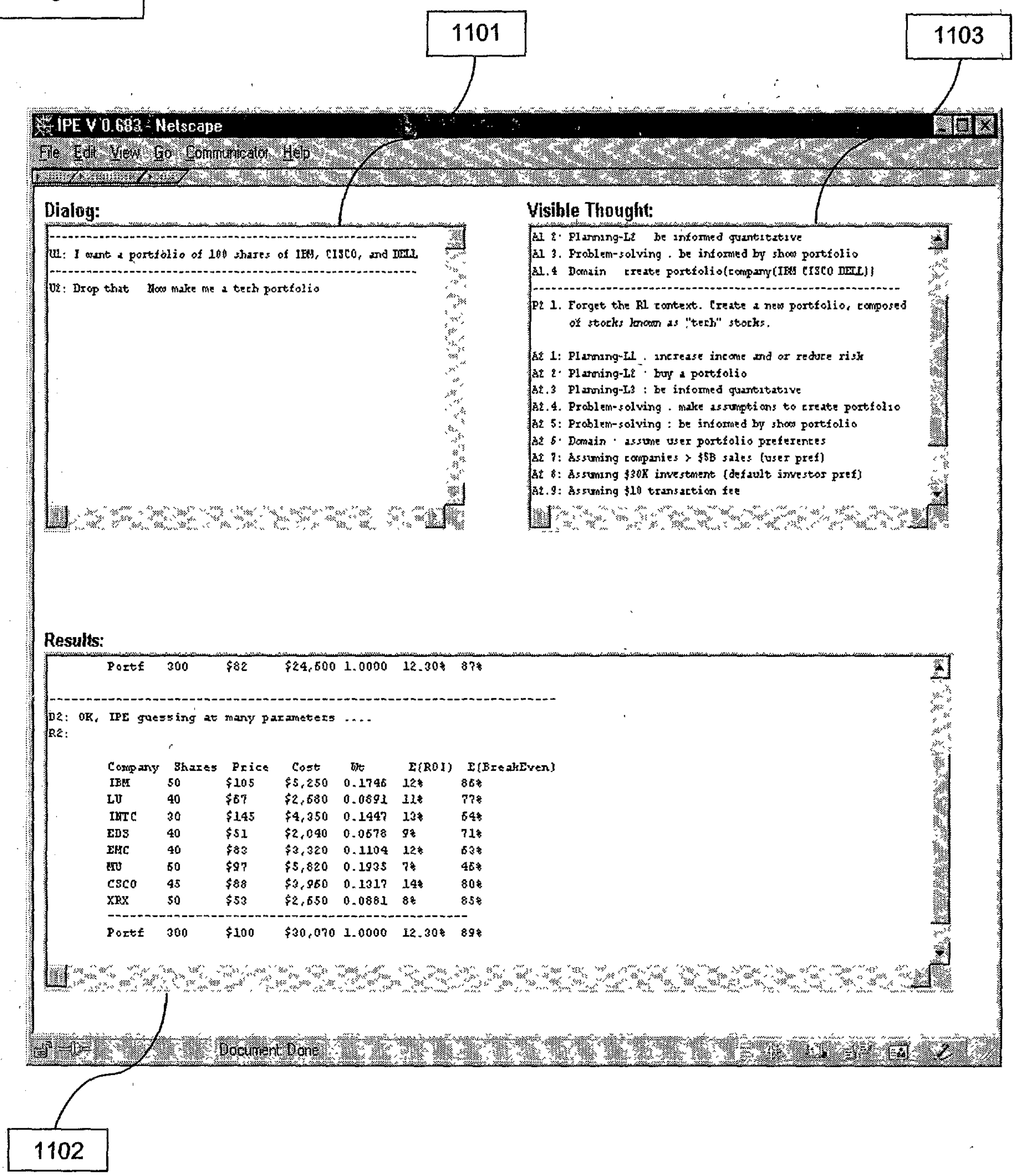

1101
1103
IPE V 0.683 - Netscape
File Edit View Go Communicator Help
Dialog:
U1: I want a portfolio of 100 shares of IBM, CISCO, and DELL
U2: Drop that Now make me a tech portfolio
Visible Thought:
A1 2: Planning-L2 be informed quantitative
A1 3. Problem-solving . be informed by show portfolio
A1.4 Domain create portfolio(company(IBM CISCO DELL))
P2 1. Forget the R1 context. Create a new portfolio, composed of stocks known as "tech" stocks.
A2 1: Planning-L1 . increase income and or reduce risk
A2 2: Planning-L2 : buy a portfolio
A2.3 Planning-L3 : be informed quantitative
A2.4. Problem-solving . make assumptions to create portfolio
A2 5: Problem-solving : be informed by show portfolio
A2 6: Domain : assume user portfolio preferences
A2 7: Assuming companies > $5B sales (user pref)
A2 8: Assuming $30K investment (default investor pref)
A2.9: Assuming $10 transaction fee
Results:
Portf 300 $82 $24,600 1.0000 12.30% 87%
D2: OK, IPE guessing at many parameters ....
R2:
Company Shares Price Cost Wt E(ROI) E(BreakEven)
IBM 50 $105 $5,250 0.1746 12% 86%
LU 40 $67 $2,680 0.0891 11% 77%
INTC 30 $145 $4,350 0.1447 13% 64%
EDS 40 $51 $2,040 0.0678 9% 71%
EMC 40 $83 $3,320 0.1104 12% 63%
MU 60 $97 $5,820 0.1935 7% 46%
CSCO 45 $88 $3,960 0.1317 14% 80%
XRX 50 $53 $2,650 0.0881 8% 85%
Portf 300 $100 $30,070 1.0000 12.30% 89%
Document: Done
1102

Fig. 12

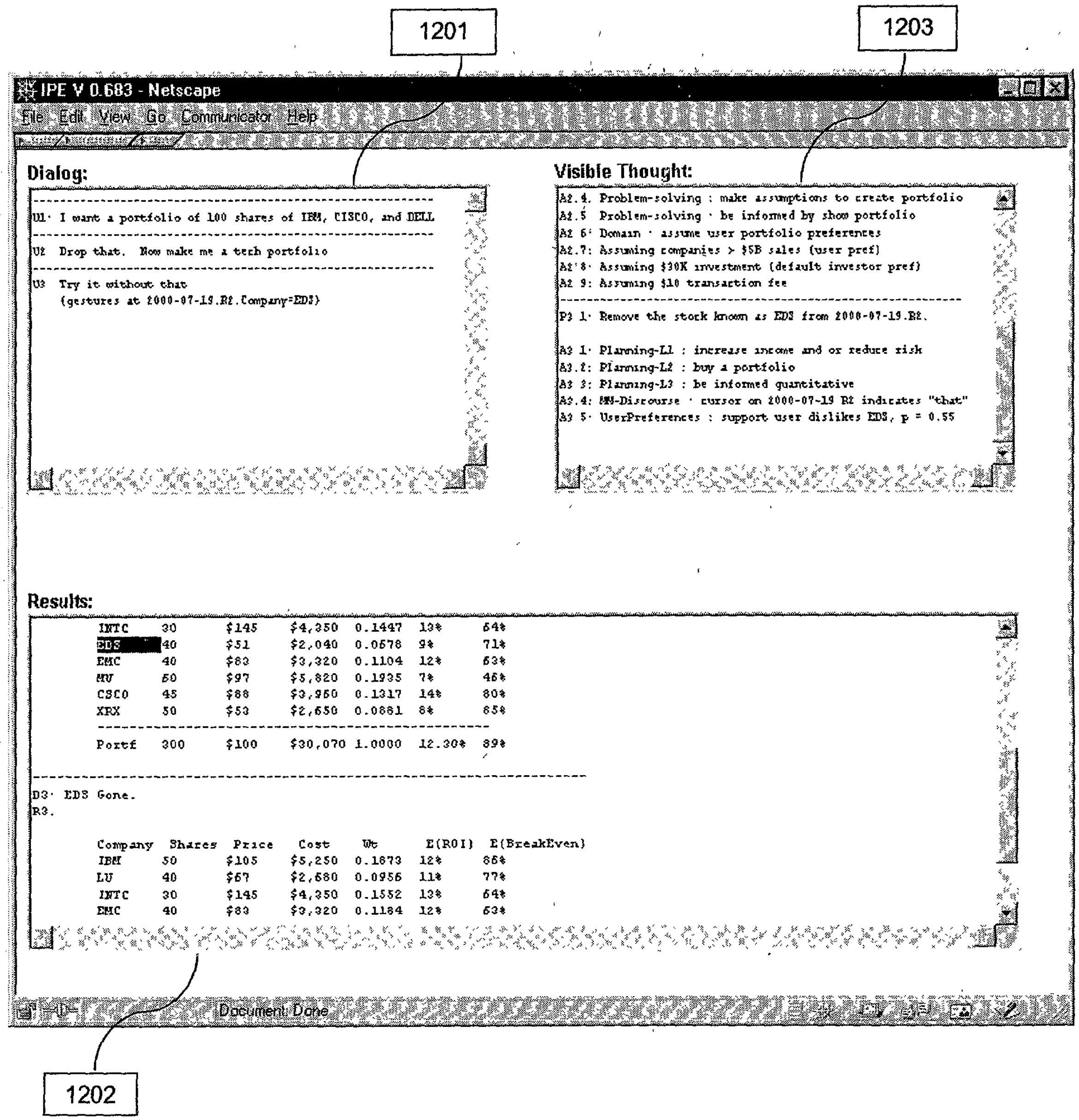

1201
1203
IPE V 0.683 - Netscape
File Edit View Go Communicator Help
Dialog:
U1· I want a portfolio of 100 shares of IBM, CISCO, and DELL
U2 Drop that. Now make me a tech portfolio
U3 Try it without that
{gestures at 2000-07-19.R2.Company=EDS}
Visible Thought:
A2.4. Problem-solving : make assumptions to create portfolio
A2.5 Problem-solving · be informed by show portfolio
A2 6· Domain · assume user portfolio preferences
A2.7: Assuming companies > $5B sales (user pref)
A2'8· Assuming $30K investment (default investor pref)
A2 9: Assuming $10 transaction fee
P3 1· Remove the stock known as EDS from 2000-07-19.R2.
A3 1· Planning-L1 : increase income and or reduce risk
A3.2: Planning-L2 : buy a portfolio
A3 3: Planning-L3 : be informed quantitative
A3.4: MM-Discourse · cursor on 2000-07-19 R2 indicates "that"
A3 5· UserPreferences : support user dislikes EDS, p = 0.55
Results:
INTC 30 $145 $4,350 0.1447 13% 64%
EDS 40 $51 $2,040 0.0678 9% 71%
EMC 40 $83 $3,320 0.1104 12% 63%
MU 60 $97 $5,820 0.1935 7% 46%
CSCO 45 $88 $3,960 0.1317 14% 80%
XRX 50 $53 $2,650 0.0881 8% 65%
Portf 300 $100 $30,070 1.0000 12.30% 89%
D3· EDS Gone.
R3.
Company Shares Price Cost Wt E(ROI) E(BreakEven)
IBM 50 $105 $5,250 0.1873 12% 86%
LU 40 $67 $2,680 0.0956 11% 77%
INTC 30 $145 $4,350 0.1552 13% 64%
EMC 40 $83 $3,320 0.1184 12% 63%
Document: Done
1202

Fig. 13

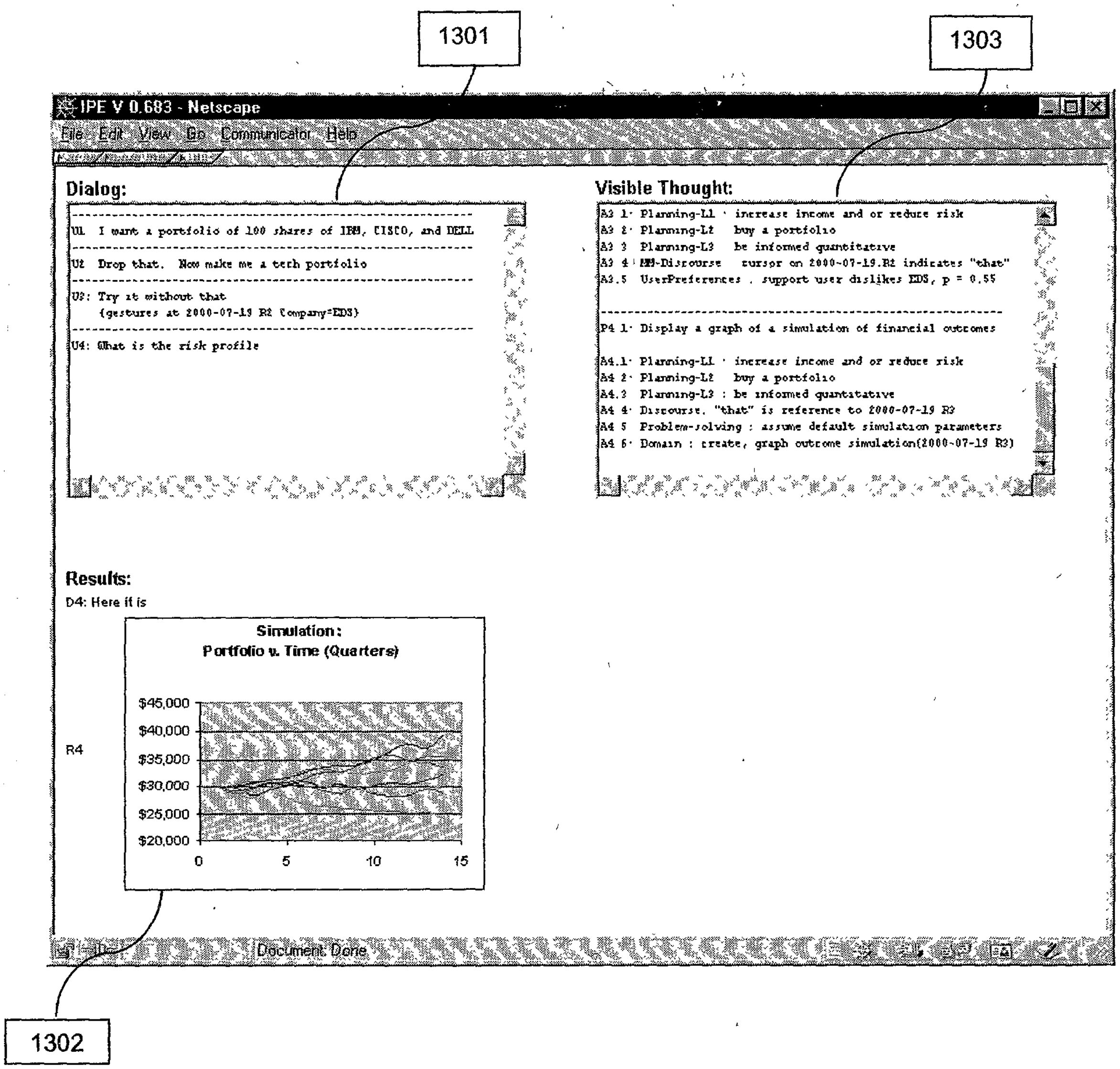

1301
1303
IPE V 0.683 - Netscape
File Edit View Go Communicator Help
Dialog:
U1 I want a portfolio of 100 shares of IBM, CISCO, and DELL
U2 Drop that. Now make me a tech portfolio
U3: Try it without that
(gestures at 2000-07-19 R2 Company=EDS)
U4: What is the risk profile
Visible Thought:
A3 1· Planning-L1 · increase income and or reduce risk
A3 2· Planning-L2 buy a portfolio
A3 3 Planning-L3 be informed quantitative
A3 4 MM-Discourse cursor on 2000-07-19.R2 indicates "that"
A3.5 UserPreferences . support user dislikes EDS, p = 0.55
P4 1· Display a graph of a simulation of financial outcomes
A4.1· Planning-L1 · increase income and or reduce risk
A4 2· Planning-L2 buy a portfolio
A4.3 Planning-L3 : be informed quantitative
A4 4· Discourse. "that" is reference to 2000-07-19 R3
A4 5 Problem-solving : assume default simulation parameters
A4 6· Domain : create, graph outcome simulation(2000-07-19 R3)
Results:
D4: Here it is
R4
Simulation:
Portfolio v. Time (Quarters)
$45,000
$40,000
$35,000
$30,000
$25,000
$20,000
0
5
10
15
Document: Done
1302

Fig. 14

1401

hist.txt - Notepad

File Edit Search Help

T1: 2000-07-19:23:32:01

U1: I want a portfolio of 100 shares of IBM, CISCO, and DELL

P1.1: Create a new portfolio, composed of 100 stocks
of each of the companies known as IBM, CISCO, and DELL.

A1.1: Planning-L1 : increase income and or reduce risk
A1.2: Planning-L2 : be informed quantitative
A1.3: Problem-solving : be informed by show portfolio
A1.4: Domain : create portfolio(company(IBM CISCO DELL))

D1: OK, Boss.
R1:

Company	Shares	Price	Cost	Wt	E(ROI)	E(BreakEven)
IBM	100	$105	$10,500	0.4268	12%	86%
CSCO	100	$88	$8,800	0.3577	14%	80%
DELL	100	$53	$5,300	0.2154	13%	78%
Portf	300	$82	$24,600	1.0000	12.30%	87%

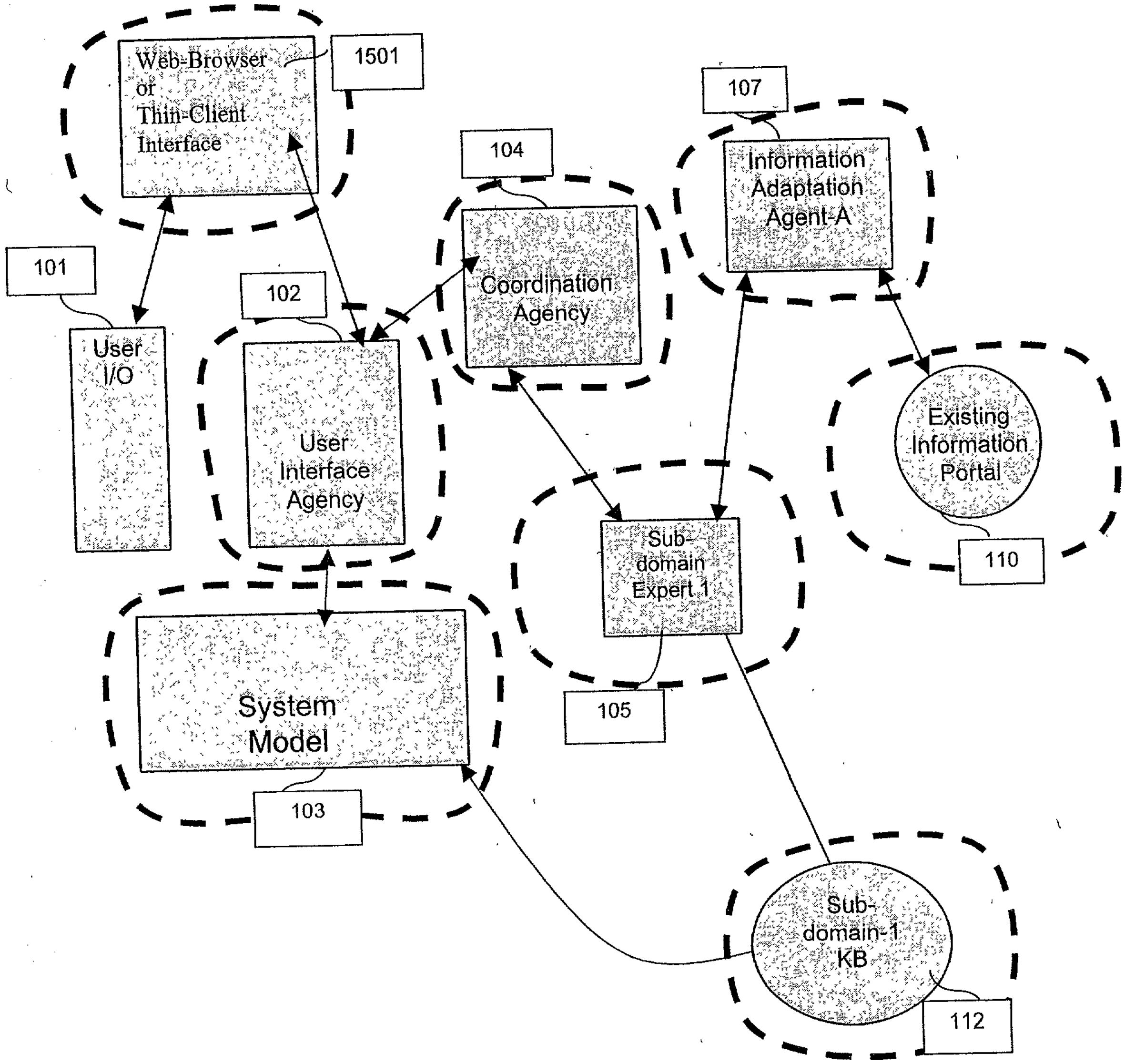
T1: 2000-07-19:24.53:20

U2: Drop that. Now make me a tech portfolio.

P2.1: Forget the R1 context. Create a new portfolio, composed
of stocks known as "tech" stocks.

A2.1: Planning-L1 : increase income and or reduce risk
A2.2: Planning-L2 . buy a portfolio
A2.3: Planning-L3 : be informed quantitative
A2.4: Problem-solving : make assumptions to create portfolio
A2.5: Problem-solving : be informed by show portfolio
A2.6: Domain : assume user portfolio preferences
A2.7: Assuming companies > $5B sales (user pref)

Fig. 15



Web-Browser or Thin-Client Interface
1501
107
Information Adaptation Agent-A
104
Coordination Agency
101
102
User I/O
User Interface Agency
Existing Information Portal
Sub-domain Expert 1
110
System Model
105
103
Sub-domain-1 KB
112

Fig 16

Simplified Strength/Necessity Belief Calculus

?X = Coffee if: 1601

?X is in a mug (s = .2; n = 0)

?X is a hot liquid (s = .4; n = 0) 1602

?X is brown (s = .6; n = .97)

?X is not tea (s = .3; n = 1)

S = Strength; N = Necessity; B = Belief; D = Disbelief;
P = Belief measure of premise (input)

Belief Evaluation Recurrence Formulae :

$B_{x+1} = B_x + (1 - B_x) * S_{x+1} * P_{x+1}$; with $B_o = 0$ 1603

$D_{x+1} = D_x + (1 - D_x) * N_{x+1} * (1 - P_{x+1})$; with $D_o = 0$

Conclusion = $B_n * (1 - D_n)$;

Example A. $\mathbf{B_4 = 0.8656}$**,**
given all 4 preconditions known to be true with absolute certainty.

Example B. $\mathbf{B_4 = 0.7648}$**,** $\mathbf{D_4 = 0.485}$**,**
Conclusion = 0.393872,
given that we are only 50% sure that the liquid is brown , but are convinced of all other facts (e.g. because the light is very dim….)

Fig. 17

Bayesian Belief Calculus -

Bayes's rule states that :

$$p(A \mid B) = \text{Prob of event A, given event B}$$
$$= (\, p(A) \; * p(B \mid A)\,) \;/\; p(B)$$

If we know the probabilities B_i for *every* way that A may be realized, we may write:

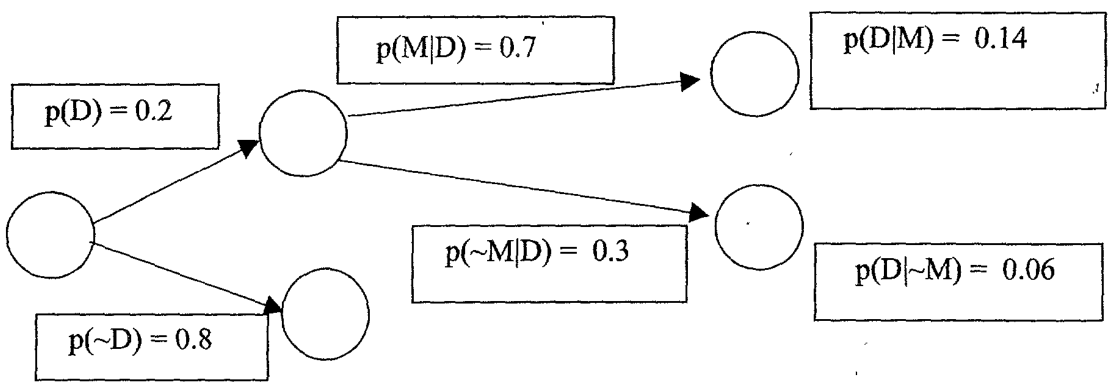
$$p(A) = \sum p(A \mid B_i)\; p(B_i)$$

Which allows a straightforward way to compute likelihood, when all possibilities are accounted for.

We can construct networks which relate Bayesian likelihood to various conditions. For example, consider the case where we are given

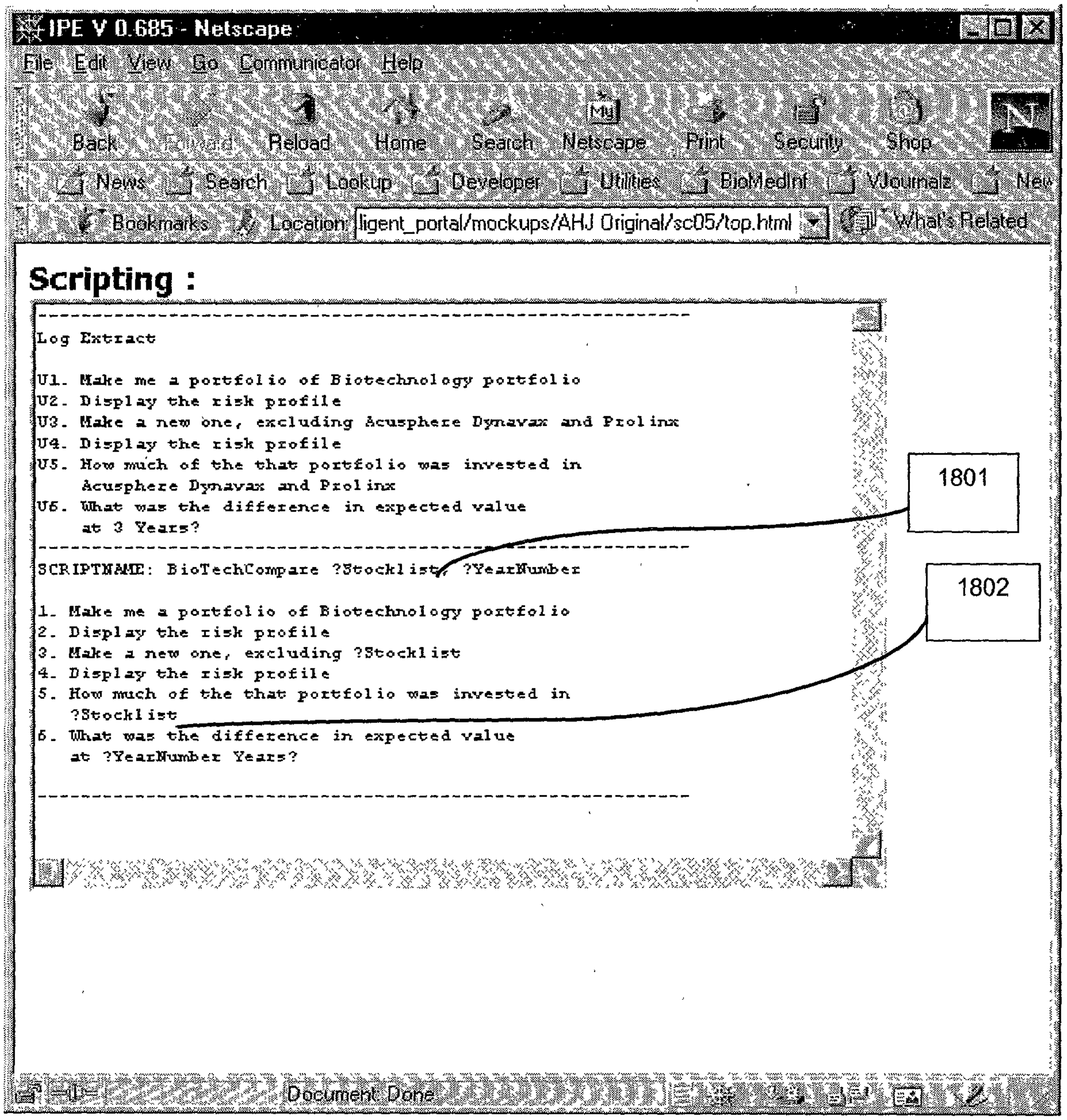
p(D) = probability of planning for retirement = 0.2, and
p(M | D) = probability of asking about mutual Funds, given D, = 0.7.

Now we can construct a graph of probabilistic influences that can be inferred:



This mechanism can be used to connect the probabilities of various plans and alternatives, and to infer likely plans from various communications.

Fig. 18


IPE V 0.685 - Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Shop
News Search Lookup Developer Utilities BioMedInf VJournals New
Bookmarks Location: ligent_portal/mockups/AHJ Original/sc05/top.html What's Related
Scripting :
Log Extract
U1. Make me a portfolio of Biotechnology portfolio
U2. Display the risk profile
U3. Make a new one, excluding Acusphere Dynavax and Prolinx
U4. Display the risk profile
U5. How much of the that portfolio was invested in Acusphere Dynavax and Prolinx
U6. What was the difference in expected value at 3 Years?
SCRIPTNAME: BioTechCompare ?Stocklist, ?YearNumber
1. Make me a portfolio of Biotechnology portfolio
2. Display the risk profile
3. Make a new one, excluding ?Stocklist
4. Display the risk profile
5. How much of the that portfolio was invested in ?Stocklist
6. What was the difference in expected value at ?YearNumber Years?
1801
1802
Document: Done